U.S. DEPARTMENT OF ENERGY | Office of Science

DOE/HEP Funding Opportunities:

- HEP Comparative Review
- SC General Solicitation
- SC Early Career Research Program
- US/Japan
- Traineeships
- Other Possible Solicitations

William Kilgore, HEP Theory Program Manager

2022 Snowmass Community Summer Study

Seattle, Washington - July 19, 2022

Outline

- Overview of University Grant Process
- Currently Open (FY 2022) FOA: RENEW-HEP
- Expected FY 2023 Funding Opportunities:
  - Recent changes that affect all Office of Science Funding Opportunites
  - HEP Comparative Review
  - Office of Science Early Career Research Program
  - Traineeships in Accelerator Science and Technology
  - U.S.-Japan Science and Technology Cooperation Program
  - Office of Science "General Solicitation"
  - Other possible calls (funding permitting):
    - RENEW-HEP, Computational HEP, AI/ML, Microelectronics

Overview of University Grant Process

Solicitation

- Drafted by HEP
- Reviewed in SC-HQ by Grants and Contracts and Budget
- Then handed to procurement channel
  - Additional reviews by dollar level
  - DOE Leadership (Secretary, Deputy Secretary, Undersecretary, SC Director) may exercise oversight
- Published by contracting officer (STRIPES to FedConnect) and SC Grants and Contracts (grants.gov, PAMS, SC Website)

Pre-Award

- Proposal submitted via Grants.gov. (Institutions submit on behalf of PI)
- Proposal transfers to PAMS (S2S integration)
- Grants and Contracts validates submission, assigns to program manager
- Program Manager conducts initial review, oversees merit review
  - May be multiple stages
- Recommendation recorded in PAMS
  - Silent negotiation (revised budget, aims, scope) and selection statement
  - Declination justification

Post-Award

- Recommendation for funding transfers from PAMS to STRIPES as a requisition
  - Chicago Office negotiates and finalizes award
  - Funds transferred from HQ to Chicago outbound account
- Award issued
  - Normal events ensue—continuations, prior approval actions, renewals, supplements
- Ultimately, closeout
  - Final reports (progress, inventions, financial, property)

University Grants: Solicitation

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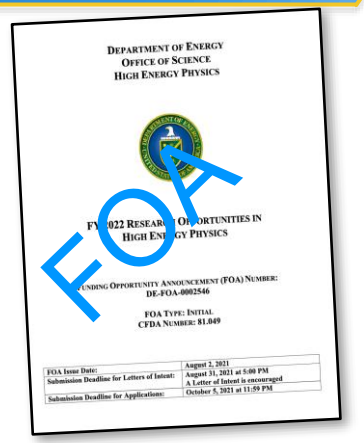
RENEW-HEP Funding Announcement (FOA) – OPEN NOW!

- **DE-FOA-0002759 issued: May 25, 2022**
  - **Letter of Intent due: Not Applicable**
  - **Final Proposal deadline: August 15, 2022**
    - Institutions are limited to no more than 3 applications.
  - **Review and Selection processes: September 2022 to November 2022**



Request Institutions and PIs to comply with all FOA requirements prior to submitting a proposal

- **Dr. Brian Beckford (HEP) held Webinars to discuss:**
  - Registration and eligibility requirements
  - Proposal types and requirements
  - Guidance for collaborative proposals
  - Guidance for PIs with existing HEP grants
  - Budget information and guidance on scope of request(s)
  - Information on overall merit review process
  - Contacts for program-or system-related questions

The FOA and informative Webinar slides are available at:
https://science.osti.gov/Initiatives/RENEW/Funding-Opportunities

DOE RENEW Initiative

- **The SC RENEW initiative advances the goals of Executive Order 13985, *Advancing Racial Equity and Support for Underserved Communities Through the Federal Government*. This was the first executive order signed by the current administration.**
  - **The RENEW initiative spans the (SC) office including:**
  - Advanced Computing Research (ASCR-RENEW), Earth & Environmental Science, Fusion Energy Sciences (FES-RENEW), Basic Energy Sciences (BES-RENEW), Isotope Training Research and Development at Minority Serving Institutions, and Reaching a New Energy Sciences Workforce for High Energy Physics (RENEW-HEP).
  - Our community has been drawn primarily from a pool of potential talent that is less diverse than the general U.S. population, and has been concentrated at larger, research-intensive academic centers.
  - Some of the barriers identified in improving diversity and equity in HEP include: **lack of sufficient mentoring , support networks, or recruitment, outreach and professional culture of inclusion at "traditional" HEP research institutions; lack of research infrastructure and support at institutions that have not traditionally received HEP funding, possibly disadvantaging them in the competitive review process; the need for additional support for faculty at institutions with large teaching loads; and general financial barriers to students pursuing degrees in STEM fields.**

Goal: build foundations for the Office of Science (SC) research at institutions historically underrepresented in the (SC) research portfolio

DOE RENEW Initiative goals

- **RENEW Goals:**
  - RENEW aims to build foundations for the Office of Science (SC) research at institutions historically underrepresented in the SC research portfolio.
  - RENEW aims to leverages SC unique national laboratories, user facilities, and other research infrastructure to provide training opportunities for undergraduate and graduate students, postdoctoral researchers, and faculty at academic institutions not well represented in the U.S. science and technology eco system.
  - RENEW aims to provide the hands-on experience that will open new career avenues for a future pool of talented scientists, engineers, and technicians with critical skills and expertise needed for the full breadth of SC research activities.

Goal: build foundations for the Office of Science (SC) research at institutions historically underrepresented in the (SC) research portfolio

RENEW-HEP: Eligible applicants

- **Eligible Institutions: Universities/colleges, DOE National Labs are eligible**
  - **All institutions of higher learning are eligible to apply.**
    - **HEP will prioritize applications that maximize participation of MSIs, non-research-intensive (non-"R1") institutions, and/or institutions not currently represented in the HEP research portfolio**

    - RENEW-HEP seeks to ensure that collaborators directly participating on RENEW awards, particularly from institutions historically underrepresented in SC research such as non-R1 institutions and Minority Serving Institutions, are fully engaged in substantive roles on the project.

U.S. DEPARTMENT OF ENERGY | Office of Science

Changes for FY 2023 FOAs

New since FY 2022 FOAs: Changes to the Biosketch

- The Office of Science (SC) requires the NSF format in the Science Experts Network Curriculum Vita (SciENcv) system (or a fillable PDF available from NSF).
  - The NSF format is not fully compatible with the information required by the FOA. Pages containing non-compatible information can be printed on a separate sheet and appended to the required format without incurring page limit violations.
  - The "Collaborator list" is no longer part of the biosketch.
  - I recommend using SciENcv over the fillable PDF:
    - Software incompatibilities have occurred when merging fillable PDFs with other proposal documents.
    - It is anticipated that the Office of Science will participate in a multi-agency effort to develop a common SciENcv Biosketch format for future FOAs and you will already be in the system.
  - Refer to the FOA for full details.

New since FY 2022 FOAs: Reporting Current & Pending Support

- The Office of Science (SC) requires the NSF format in the Science Experts Network Curriculum Vita (SciENcv) system (or a fillable PDF available from NSF).
  - The NSF format is not fully compatible with the information required by the FOA. Pages containing non-compatible information can be appended to the required format without incurring page limit violations.
  - I recommend using SciENcv over the fillable PDF:
    - Software incompatibilities have occurred when merging fillable PDFs with other proposal documents.
    - It is anticipated that the Office of Science will create its own SciENcv Current & Pending Support format for future FOAs and you will already be in the system.
    - The fillable PDF has many pages allowing a large number of entries. If used, please delete unused pages. There is no benefit to making Program Managers and Reviewers scroll through dozen of empty pages looking for content.
  - All foreign government-sponsored talent recruitment programs must be identified in current and pending support. Details of any obligations, contractual or otherwise, to any program, entity, or organization sponsored by a foreign government must be provided on request to either the applicant institution or DOE.
  - Refer to the FOA for full details.

New since FY 2022 FOAs: Collaboration List

- The list of Collaborators and other Individuals Who Should Not Serve as Reviewers is no longer part of the Biographical sketch. It should be attached to:
  - Letters of Intent (LOI) and/or Pre-Proposals and
    - Having this in the LOI helps HEP Program Managers to use the information in reviewer selection and assignment.
  - Submitted with the proposal, separate from Biosketches, Appendices, etc., as described in the FOA
    - Including the list in the LOI/Pre-proposal does NOT excuse you from attaching it to the proposal
- The list should include:
  - Graduate and Postdoctoral Advisors and Advisees.
  - Specify the Association. The Graduate student Adivsor/Advisee relationship is a lifetime COI; the Postdoctoral Advisor/Advisee relationship is not.
  - Collaborator and Co-editors on research publication within 48 months of proposal submission.
    - Members of large collaborations (10+) **should not** list every co-author; only list those with whom the applicant collaborated.
  - For each person named, provide first name, last name, ORCiD (if known), institutional affiliation, reason for being listed, year of most recent collaboration, etc.
  - An Excel template is available for download from SC.
- Refer to the FOA for full details

New since FY 2021 FOAs: Appendix on Recruitment and Retention

Recruitment and Retention of Students and Early-Stage Investigators

- For your institution and research group:
  - Describe plans for recruiting and retaining graduate students and early-stage investigators (untenured faculty, postdoctoral researchers, and others);
  - Explain how such personnel will be trained and mentored in the conducting proposed activities;
  - Provide a plan to help foster a diverse, equitable and inclusive research environment;
  - Describe anticipated progression of such personnel toward degrees or in their careers;
  - Describe how you assess the success of your research group in training and mentoring early-stage personnel;
  - You may include a list of past students and other former early-stage personnel along with their current (or last known) position(s) as a reference

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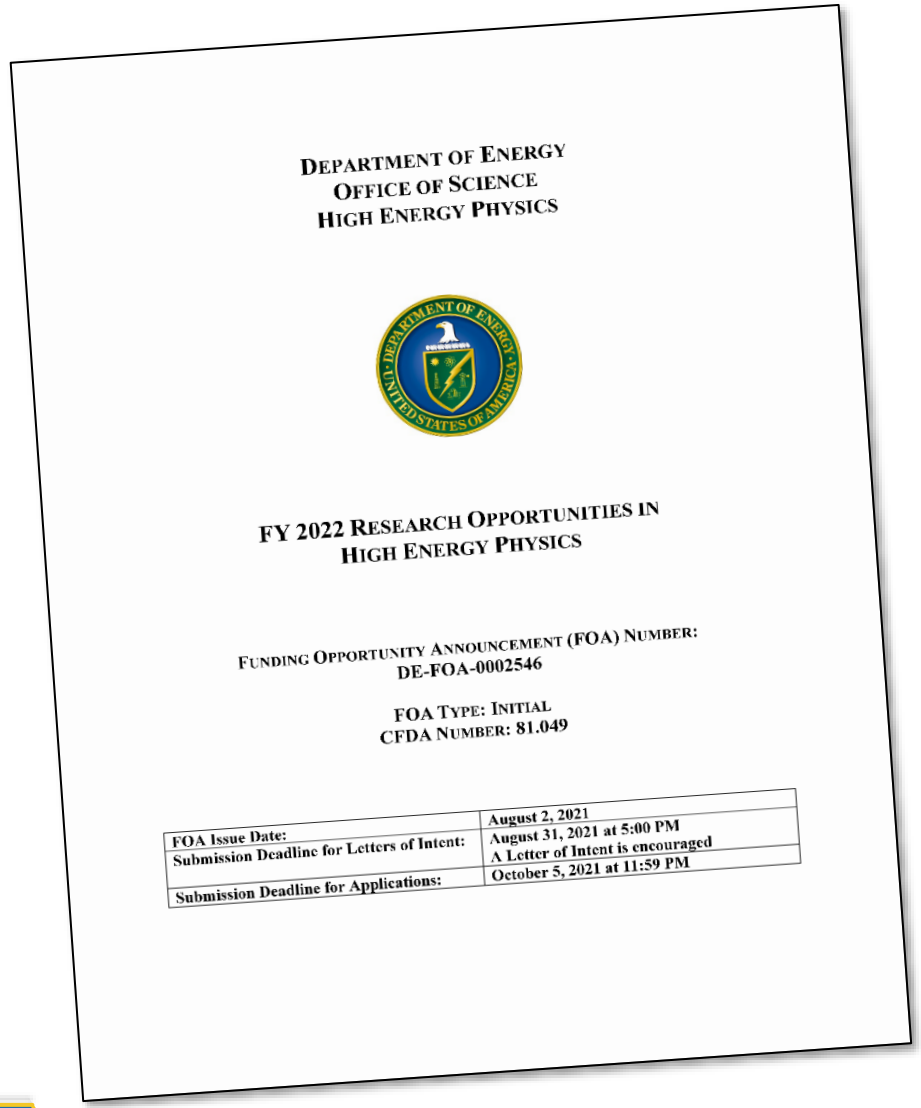
HEP FOAs for FY 2023

HEP Comparative Review



DEPARTMENT OF ENERGY
OFFICE OF SCIENCE
HIGH ENERGY PHYSICS

FY 2022 RESEARCH OPPORTUNITIES IN
HIGH ENERGY PHYSICS

FUNDING OPPORTUNITY ANNOUNCEMENT (FOA) NUMBER:
DE-FOA-0002546

FOA TYPE: INITIAL
CFDA NUMBER: 81.049

FOA Issue Date:	August 2, 2021
Submission Deadline for Letters of Intent:	August 31, 2021 at 5:00 PM A Letter of Intent is encouraged
Submission Deadline for Applications:	October 5, 2021 at 11:59 PM

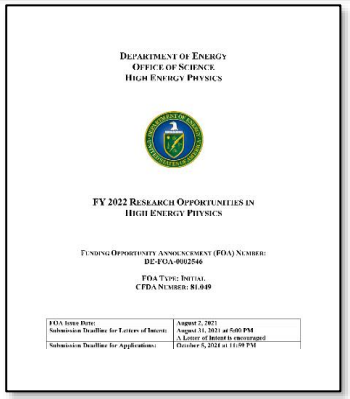
University HEP Comparative Reviews

- **Since FY 2012, DOE/HEP uses a process of comparative grant reviews for university research grants – those scheduled for renewal and any new proposals**
  - **The FY 2023 Funding Opportunity Announcement (FOA) marks 12th round in the process**
  - **Each HEP subprogram at the DOE national laboratories is also reviewed every 3-5 years**
- **Process was recommended by several DOE advisory committees, including the 2010, 2013, 2016 and 2020 HEP Committee of Visitors (COV):**
  - 2010 COV: *"In several of the cases … proposal reviewers expressed negative views of the grant, but only outside of their formal responses. Coupled with the trend in the data towards very little changes in the funding levels over time, this suggests that grants are being evaluated based on the historical strength of the group rather than the current strength or productivity of the group. This is of particular concern when considering whether new investigators, new science, or high-risk projects can be competitive. Comparative reviews can be a powerful tool for addressing these issues and keeping the program in peak form."*
    - use comparative review panels on a regular basis
  - 2013 COV: Continue comparative reviews. Augment with independent mail-in reviews
  - 2016 *and* 2020 COV: Continue comparative reviews
    - Continue communicating with PIs about program priorities at DOE-HEP PI meetings
    - Provide guidance to reviewers on, e.g., more uniform scoring, DE&I, …

Goal: improve overall quality and efficacy of the HEP research program by identifying the best proposals with highest scientific impact and potential

FY 2023 HEP Comparative Review FOA and FAQ

- **DE-FOA-000xxx issued: Still under DOE Review**
- **Six HEP research subprograms**
  - Energy, Intensity, and Cosmic Frontiers
  - HEP Theory, Accelerator Science and Technology R&D, and Detector R&D
- **Letter of Intent (strongly encouraged) due: TBA**
- **Final Proposal deadline: TBA**
- **Review process: October 2022(?) – February 2023**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PIs and university SROs should read the FOA carefully to comply with all requirements prior to submitting a proposal.

- **In addition to the FOA, an FAQ will be available to address topics:**
  - Registration and eligibility requirements
  - Proposal types and requirements;
  - Guidance for new faculty and those without current grants
  - Guidance for PIs with existing HEP grants
  - Budget information and guidance on scope of request(s)
  - Letter of Intent
  - Information on overall scientific merit review process
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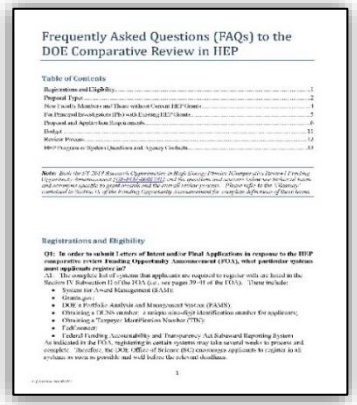

Frequently Asked Questions (FAQs) to the DOE Comparative Review in HEP

Table of Contents

Registrations and Eligibility

Both the FOA and FAQ will be available at: *https://science.osti.gov/grants/FOAs/Open*

New to the FY 2023 FOA:

- There are changes to the Comparative Review FOA for FY 2023:
  - New instructions on the Project Narrative.
    - No change in page limits, but clarifications about topics to be included
  - Alternative ways to submit sub-program budgets for multi-task proposals.
  - Expect changes to the Merit Criteria, including a new Merit Criterion regarding Recruitment and Mentoring Plans for junior personnel.

Proposal Project Narrative

- **The Project Narrative comprises the *research plan* for the project**
  - Should contain enough background material in the introduction to demonstrate sufficient knowledge of the research
  - Devote main portion to a description and justification of the proposed project, include details of the methods to be used and any relevant results
  - Indicate which project personnel will be responsible for which activities
  - Include timeline for the major activities of the proposed project
- **Must not exceed 9 pages per senior investigator when printed on standard 8 ½" x 11" paper with 1-inch margins (top, bottom, left, and right). Font must not be smaller than 11 point.**
  - Senior investigator means active tenured or tenure-track faculty member at the sponsoring institution
  - Non-tenure track faculty (e.g., research scientists) or senior research staff with term appointments are not included in the 9-page limit per senior investigator unless they are the sole senior investigator on the application
  - Faculty members at collaborating institutions listed on the proposal (if any) are not included
- **PIs encouraged to refer to Section IV of the planned FOA**
  - Includes useful information to help PIs in preparing better narratives — for e.g.:
    - What to address for the Background/Introduction
    - Multiple Investigators and/or Multiple Research Subprograms or Thrusts
    - Common narrative with overview of each group's activities in different research areas
      - Discussion of any synergies and connections between areas
    - Proposed Project Objectives, Research Methods, Resources
    - Timetable and Level of Effort of different activities, …

New since the FY 2022 FOA: Instructions for Project Narrative

- We have added suggestions for the Project Narrative to provide reviewers with clearer picture of the research activities:
  - Progress Report (for Renewal Applications): The narrative should include a section describing:
    - Work accomplished during the current (pre-renewal) project period and the connection to the work being proposed
    - Identify graduate students and postdocs supported and whether they would continue to be supported in the next project period.
    - Estimate unspent funds that will remain at the end of the current project period.
  - For research being proposed: provide a brief review of background material: literature review, prior research by PI, …
  - The bulk of the narrative should consist of a description and justification of the proposed project including details of the methods to be used.
  - Include a timeline for major activities.
  - For collaborative projects, provide a clear delineation of responsibilities.
  - Research using AI or ML:
    - Describe any efforts in AI/ML and their importance to completing the proposed research.
    - Describe the methods to be used and expected impact on scientific results.
    - Identify personnel (including postdocs and students) who would be involved and level of effort.
- Refer to the FOA for full details

Key Items to Keep in Mind

- Proposed research will review best if closely aligned with the DOE/HEP mission, its program, and the P5 strategy
- Investigators in experimental HEP research frontiers (Energy, Intensity, Cosmic) will review best if they are closely integrated into HEP experiment collaborations and have key roles and responsibilities on those experiments
- "Generic" research that is not to be carried out as part of a specific HEP experimental collaboration should be directed to the HEP Theory or Detector R&D programs, as appropriate.
- **Read the FOA carefully** and follow the requirements on content, length, etc.
  - **Some FOA requirements are set from outside the DOE/HEP office**, and there is little to no flexibility to modify.
    - **Non-compliant proposals submitted to the FOA will not be reviewed.**
- **In recent years, ~5% of incoming proposals are declined without review.** The most often missed or overlooked requirements include: Page limits, separate budget sheets (if needed) for each research subprogram or thrust, Data management plans, and inclusion of Personally Identifiable Information (PII).
  - Most declinations occur for "new" proposals. Ask a mentor or experienced PI for help.
- **During and prior to submission, work with your university sponsored research office to make sure all FOA requirements are met.**

Artificial Intelligence / Machine Learning

- **AI/ML continues to be a priority for the Administration and for the U.S. Congress.**
  - Appropriations since FY 2020 have provided dedicated funds in DOE/HEP Research Program to advance AI/ML initiatives.
- **The development and implementation of machine or deep learning tools, techniques, and algorithms are rapidly becoming part of many experimental analyses and some theoretical work.**
- **There are typically two categories of AI/ML-based proposal narratives:**
  1. **Developer:** PIs and their research teams are explicitly leading efforts to develop ML-based tools and algorithms for the collaboration to enhance sensitivity in physics studies.
  2. **End-user:** PIs and their research teams are implementing ML-based algorithms , which were developed by others, in an analysis.
  - "Developers" usually draw better reviews in research proposals than "end-users".
- **The FY 2023 FOA is expected to encourage investigators to identify their research group's AI/ML efforts in the proposal narrative as they would for other key areas of expertise.**
  - If applications or development of AI/ML techniques are a part of your research effort, call attention to it so that it can be properly reviewed. Consider adding a dedicated section to your narrative to describe the research group's efforts in AI/ML and their importance to completing the proposed research, explaining the associated AI/ML methods used and their impact to advance the group's scientific results. Identify the personnel and effort level (e.g., graduate students, postdoctoral researchers, etc.) carrying out AI/ML activities in the proposed research plan.

HEP Research Activities Supported

- **What DOE/HEP supports**
  - Efforts that are in direct support of DOE/HEP programs
    - support depends on merit review process, programmatic factors, and available funds
  - Research efforts (mainly scientists) on R&D, exp. design, data-taking, analysis-related activities
  - Some engineering support may be provided through the DOE/HEP Detector R&D subprogram
  - Theory, simulations, phenomenology, computational studies
- **Faculty support**
  - Based on merit reviews and/or optimizing the number of research personnel supported by financial assistance awards, support of up to 2-months faculty summer salary
  - Summer support should be adjusted according to % time the faculty is on research effort
- **Research Scientists**
  - Support may be provided, but due to long-term expectations, need to consider case-by-case on merits: whether the roles and responsibilities are well-matched with individual capabilities and cannot be fulfilled by a term position
  - Efforts should be related towards research; not *long-term* operations and/or project activities
- ✖ **What's not supported by 'Research' grants**
  - Any significant HEP operations and/or project-related activities:
    - engineering, major items of equipment, consumables for prototyping or production
  - Non-HEP related efforts — *e.g.:*
    - gravity waves (LIGO); heavy-ion (RHIC *or* at the LHC)

Research Scientists (RS) …

- **Panels will evaluate RS efforts where support is requested in a comparative review proposal**
- **Guidance to PIs given in Q&A of FAQ…**
  - Requests to support RS dedicated full-time (and long-term) to operational and/or project activities for an experiment will not be supported by respective frontier research areas
  - If RS conducting physics research-related activities, requests [scaled to % of time on such efforts] can be included
    - any final support will be based on the merit review process
- **Common [past] reviewer comments that may result in unfavorable merit reviews:**
  - 'RS conducting scope of work typically commensurate at the postdoctoral-level…'
  - 'RS involved in long-term operation/project activities with minimum physics research efforts…'
    - such efforts may review well in a DOE review of the operation/project program but not as well in a review of the experimental research program
- **What are "physics research-related activities"?**
  - Object reconstruction/algorithm development, performance studies, data taking and analysis, and mentorship of students & postdocs in these areas
  - Scientific activities in support of detector/hardware design and development
- **From the research program, cases become an issue when operations/projects become the *dominant* activity 'long-term'**
  - A well-balanced portfolio that includes physics research-related activities is encouraged
  - **Important to narrate complete plans in 2-page "appendix narrative"**

Cross-cut, Multi-thrust, or Transitional Proposals

- **Applications where a PI is proposing to conduct research across multiple HEP research subprograms during the project period will be considered**
- **PIs are encouraged to submit only one application, describing:**
  - Overall research activity, including fractional time planned in each subprogram
  - In proposal's Budget Justification material (Appendix 7), include a level-of-effort table for any transitions of effort during project period
- **As part of their overview of the subprogram and review process, DOE PMs will provide the panel with details regarding such research plans across multiple HEP thrusts**
- **Reviewers with appropriate topical expertise in the research area(s) will assess the full scope, relevance, and impact of the proposed research in the merit review process — *e.g.*, merit review questions consider:**
  - Are plans for such cross-cutting efforts reasonably developed and balanced?
  - Does the scope of the full proposed program provide synergy or additional benefits to the HEP mission beyond the individual thrusts?
  - Will PI's overall efforts across multiple thrusts add value to HEP program goals and mission and have impact?

Proposal Budgets and Budget Justifications

- Applicants are encouraged to work with their SRO/SPO to develop their budgets and budget justifications with the same care that is devoted to the project narrative.
  - Reviewers and panelists often express frustration and/or confusion about budget details leading to lengthy panel discussions about what is being requested.
  - Points for consideration:
    - Funds are awarded to the institution. Understand direct and indirect rates, benefits, and restrictions
    - Establish a relationship with your budget office and/or sponsored research/program office; Remember they submit the proposal for you!
    - Reviewers will notice and call out:
      - Excessive or inappropriate requests
      - Arithmetic errors
      - Poorly justified expenses
      - Discrepancies between the project narrative and budgeted expenses
  - Worst case: Reviewers will start guessing if items are not adequately explained.

New since the FY 2022 FOA: Changes to Additional Budget Requirements

- If support is requested from two or more HEP research subprograms, you must provide a supplemental Title Page identifying each research thrust, the Senior/Key Persons involved in each subprogram, and the budget request for each year.
  - This requirement does not apply to applications that request support from only a single research thrust, e.g., Accelerator Science and Technology R&D, Theory, CMS, ATLAS, LSST, DESI, DUNE, etc.
- There are two options for submitting the additional budget information:
  - (Old) Attach budget forms in the style of SF-424 (R&R) budget pages as well as justifications in Appendix 7.
  - (Preferred) Use the SF-424 (R&R) Subaward Budget forms available in grants.gov to submit budgets for each subprogram or separate research task. You can attach the separate justifications to the subaward budgets. See instructions in the FOA.
- If individual investigators requests support from two or more HEP research subprograms and/or thrusts (including two or more thrusts in the same research subprogram), they must provide information on the distribution of their full-time effort (FTE) in a table.
- Refer to the FOA for full details.

Not-so-New Updates in the FOA

- **All Research proposals submitted to DOE Office of Science must have a Data Management Plan (DMP)**
  - Includes HEP comparative review and Early Career, but not proposals for conferences, workshops, operations, or projects
  - Any thrust in a proposal without a DMP will be declined without review
  - A DMP that is blank or states "not applicable" will not be accepted
- **All Renewal proposals must submit "Renewal Proposal Products" (publications, etc.) *after* the application is submitted**
  - PIs are notified by PAMS and have 5-7 days to respond .
  - We cannot send renewal proposals out for review until this step is completed.
  - Prior-year 'products' are captured with your annual Progress Report but during the review process, applicants are able to update past entries and add current-year products to be considered in the merit review process.
- **Recurring submissions of Research applications (initiated in FY 2018)**
  - **"Previously declined applications that have not been substantially revised in light of merit reviewer comments may be declined without additional merit review and will not be considered for funding."**
- **All FOAs have different eligibility, technical requirement, page limits, etc.**
  - **Prior to any submission, read the FOA carefully!**

Data Management Plan

- **Data management involves all stages of the digital data life cycle: capture, analysis, sharing, and preservation. The SC Digital Data Management Statement focuses on sharing and preserving digital research data.**
  - See Dr. Laura Biven's presentation on SC Digital Data Management, Sept. 2014 HEPAP meeting: *https://science.osti.gov/hep/hepap/Meetings/201409*.
  - FOAs issued after October 1, 2014 require a DMP and compliance with the SC Statement.
    - SC statement on DMP available at: *https://science.osti.gov/Funding-Opportunities/Digital-Data-Management*.
    - DMPs are included as an appendix of the proposal.
    - See also Section IV of the comparative review FOA, the subsection for Appendix on 'Data Management Plan', for requirements pertaining to DMPs that must be included in an application .
- **Most International collaborations have developed DMPs for their collaborations**
  - Those seeking financial assistance grants [universities] or submitting FWPs [labs] for 'research' support can cite the DMPs for the respective experiment with the appropriate links.
    - If an experiment's DMP is cited, the PIs must briefly describe how proposed research relates to that experiment.
  - Theorists need DMPs: explain how theoretical/simulated data can be accessed/validated.
  - If there are no data of any sort generated by the proposed research, the DMP must state this. A DMP that is blank or states "not applicable" is not acceptable.

Each research thrust in a proposal requesting DOE research support, including the FY 2023 Comparative Review FOA, must address the DMP requirements to be reviewed and considered for funding

New since the FY 2022 FOA: New Merit Criterion

- A new merit criterion has been added for proposal evaluation:

Quality and Efficacy of Recruitment and Mentoring Plan

- What is the past performance of the investigator(s) for mentoring and advancing career opportunities of students and other early-stage personnel in their research team?
- Does the proposed plan to recruit and retain students and early-stage investigators provide sufficient mentorship, either towards completion of a degree or advancing their career?
- Are any plans proposed for recruiting additional scientific and/or technical personnel including new senior staff, students, and postdocs reasonable, justified, and appropriate?
- Is the proposed plan likely to lead to satisfactory outcomes and an advancement in career opportunities for students and other early-stage personnel?
- Does the proposed plan by the team help ensure a diverse, equitable, and inclusive research environment?

Further Guidance on Review Criteria and Policy Factors

For Principal Investigators

- Merit review criteria and corresponding questions are given in Section V of the FOA
- Program Policy Factors, which are also used in selections for an award – including those pertaining to the availability of funds – are given in Section V of the FOA
- These serve as additional guides for PIs to address in their proposal's project narratives
  - Provide a plan! Do not just write paragraphs explicitly addressing each merit review criterion and program policy factor. Instead, integrate and adapt these (as appropriate) when narrating the group's activities and research plans.

For Reviewers/Panelists

- The same merit review criteria and corresponding sub-questions are given to all reviewers to input their reviews in DOE's Portfolio Analysis and Management System (PAMS)
  - Serves as a guide for reviewers to address each review criteria for written reviews
- These are highlighted by DOE Program Managers at the beginning of panel deliberations
- These are presented and discussed by individual panelists for each proposal
- Other Program Policy Factors are also discussed with panelists
  - For e.g., program alignment with respect to the P5 strategic plan, fostering development of diverse cadre of supported researchers, and opportunity for early-stage investigators and/or junior scientific personnel

Guidance Checklist for FY 2023 Comparative Review

- **Non-compliant applications will not be reviewed, and therefore, will not be considered for funding. As a convenience and courtesy, DOE/HEP plans to provide a checklist in the FY 2023 FOA.**
  - **The list, found on the opening pages of the FOA, is not intended to be complete. Applicants should review the FOA in-detail and follow all instructions.**

HEP Comparative Review FOA – GUIDELINE FOR APPLICATION REQUIREMENTS	COMPLETED
Is the proposed research scope aligned with programmatic priorities of DOE/HEP?	☑
Personally Identifiable Information (PII): Do not supply any information, such as birth date or place, citizenship, home address, personal phone nos., etc., that should not enter into the merit review.	☑
Is Appendix for a Data Management Plan submitted? Comply with page-limit requirements specified in the FOA?	☑
Project Summary/Abstract Page: contains the name(s) of the applicant, the project director/principal investigator(s) and the PD/PI's institutional affiliation, and any Co-Investigators and their affiliations.	☑
DOE Cover Page: list each HEP research subprogram (e.g., Energy Frontier, HEP Theory, etc.) for which funding is requested. If support is requested from more than one subprogram, be sure to attach the Cover Page Supplement, as specified in the FOA.	☑
Page Limits: Complied with all page limits as defined in Section IV of the FOA?	☑
Senior/Key Persons forms are filled out and compliant Biographical Sketches and reports of Current and Pending Support are attached for each Key Person.	☑
In addition to the budget information for the full proposal: separate budget and budget justification narratives for each HEP research subprogram in the proposal for each year in which funding is being requested and for the cumulative funding period has been provided in Appendix 7.	☑
Level-of-Effort Tables completed in Budget Justifications in Appendix 7: for each person for whom funding is requested in a research thrust, on the scope of activities during proposed project period.	☑
Include Appendix 6 narrative addressing recruitment and retention of students and early-stage investigators	☑
Post-submission of a 'renewal' application, timely submitted the Renewal Proposal Products (RPP) in PAMS.	☑

Comparative Review: Subprogram Panels

- The Comparative Review process is very competitive and hard choices must be made based on the reviews and our available funding
  - As this is a comparative process, some proposals/PIs will be ranked at the top while others will be in the middle or at the bottom
- It is understood that the vast majority of people applying are working hard and their efforts are in support of the HEP program. Due to the rankings & comments by the reviewers and our constrained budgets, some people whose research activities and level of effort who are ranked lower in terms of priority and impact relative to others in the field will not be funded
  - This does not necessarily mean the person cannot continue working on the experiments; they are not being funded by the grant to do it. It could be that the person has a critical role in the program, but this did not come out in the proposal or review process.
  - This is why it is imperative to respond to the FOA and detail each person's effort.
- Members of subprogram review panels see all of the proposals and each member provides input and ranks proposals relative to the others. When panel members are faced with comparing efforts, impacts and limited budgets, rather than rank the whole proposal low, theymay provide guidance regarding details of the proposals.
  - e.g., Section A looks good but Section B looks weak and shouldn't be supported at the requested level.

U.S. DEPARTMENT OF ENERGY | Office of Science

Office of Science
Early Career Research Opportunities

Early Career Research Opportunities

- The Office of Science offers programs for early-career researchers from undergraduates to junior faculty.
- The Office of Science Workforce Development for Teachers and Scientists offers three programs of particular interest:
  - **Science Undergraduate Laboratory Internships (SULI)**
    - Supports undergraduate research at a DOE lab, 10 to 16 weeks
    - Three calls per year, following Spring/Summer/Fall terms
  - **The Visiting Faculty Program (VFP)**
    - Seeks to increase the research competitiveness of faculty members and students from institutions of higher education that are historically underrepresented in the research community to expand the workforce that addresses DOE mission areas.
    - One calls per year, for Summer term
  - **Office of Science Graduate Student Research fellowships (SCSGR)**
    - Supports grad student research at a DOE lab, 3 to 12 months
    - Two calls per year, usually Feb/Aug.
    - Applications typically due May/Nov for following Fall or Summer start
- Most of the rest of this talk will be devoted to the Office of Science Early Career Research Program offering high-profile awards to outstanding junior faculty within 10 years of Ph. D.

Science Undergraduate Laboratory Internships (SULI)

The SULI program encourages undergraduate students and recent graduates to pursue science, technology, engineering, and mathematics (STEM) careers by providing research experiences at the Department of Energy (DOE) laboratories.

- SULI participants work on science and engineering research projects with laboratory scientists and engineers who serve as mentors.
- Student deliverables include a research report, an oral or poster presentation, a peer review, a general audience abstract, and pre- and post-participation surveys.
- 10 weeks during the Summer term (May-August); 16 weeks during the Fall (August-December) or Spring (January-May) terms.

Award Benefits:

- Paid internships ($650 weekly stipend, dedicated funding for travel and lodging)
- Labs provide training seminars and professional development opportunities

Eligibility:

- U.S. citizen or legal permanent resident
- Undergraduates from 2- or 4-year colleges, freshmen through senior year or recent graduates
- At least 18 years old at time of application
- Minimum cumulative GPA 3.0
- May participate in SULI twice; may apply up to three times

3 Terms Annually: Summer, Fall, and Spring

2022 Fall Term – Application due May 26, 2022; 2023 Spring Term – Application Started July 14, 2022; 2023 Summer Term – Application to start mid-October 2022

Full details, requirements, FAQs, and link to application at: https://science.osti.gov/wdts/SULI/

Program Contact : sc.suli@science.doe.gov

Visiting Faculty Program (VFP)

The Visiting Faculty Program (VFP) seeks to increase the research competitiveness of faculty members and students from institutions of higher education that are historically underrepresented in the research community to expand the workforce that addresses DOE mission areas.

- VFP appointees collaborate directly with research staff at DOE laboratories on projects that are connected robustly to ongoing host lab research.
- Faculty must establish a collaboration with a laboratory scientist to co-develop a 6-page research proposal before applying to VFP.
- Participants develop skills that are applicable to programs and STEM workforce development at their home institutions.

Award Benefits:

- Appointments are for 10 weeks in the summer term
- Faculty: $15,000 stipend; round-trip domestic travel to laboratory; housing covered
- Undergraduates: Same as for SULI
- Graduate students: Travel and housing, but no stipend

Academic Institution Requirements:

- Schools may not have Carnegie Classifications of "Doctoral/Research Universities ratings of Very High or High Research Activity". **All Historically Black Colleges and Universities (HBCU) are eligible.**

Eligibility for Faculty:

- U.S. citizens or lawful permanent residents at time of application
- Must work full time at an accredited, degree-granting, postsecondary U.S. institution (including community colleges). Adjunct or visiting faculty are ineligible
- Must work in an area of physics, chemistry, non-medical biology, engineering, environmental sciences, geology or geosciences, mathematics, materials sciences, or computer or computational sciences

2023 Spring Term – started July 14, 2022; 2023 Summer Term – Application to start mid-October 2022

Full details, requirements, FAQs, and link to application at: https://science.osti.gov/wdts/VFP/

Program Contact : sc.vfp@science.doe.gov

Office of Science Graduate Student Research (SCGSR) Program

The SCGSR Program provides supplemental awards to outstanding graduate students to spend 3 to 12 months conducting part of their doctoral thesis/dissertation research at a host DOE national laboratory/facility in collaboration with a DOE laboratory scientist.

- Graduate students must apply online through the online application system.
- The application requires a research proposal and letters of support from both the graduate student's thesis advisor and the collaborating DOE laboratory scientist.
- Student's research and proposed SCGSR project must be aligned with one of the identified SCGSR priority research areas defined by the SC Program Offices and specified in the solicitation.
- Applications proposing to use an SC user facility must apply for user facility time separately.

Award Benefits:

- A monthly stipend of up to $3,000/month for general living expenses
- Reimbursement of inbound/outbound traveling expenses to/from the host DOE laboratory/facility of up to $2,000

(Award payments are provided directly to the student)

Eligibility:

- U.S. Citizen or Lawful Permanent Resident
- Qualified graduate program & Ph.D. Candidacy
- Graduate research aligned with an SCGSR priority research area
- Establishment of a collaborating DOE laboratory scientist at the time of application

2 Solicitations (S) Annually: S1 and S2

2022 S1 - Applications due May 4, 2022, 5:00 PM ET; 2022 S2 – Application to start mid-August 2022

Full details, requirements, FAQs, and link to application at: https://science.osti.gov/wdts/scgsr/

Program Contact : sc.scgsr@science.doe.gov

Early Career Research Program

- ERCP Launched in 2009 across all Office of Science.
  - Successor to and replacement of highly successful DOE-HEP-OJI program (1978-2009), upon which it is modelled.
- Open to university tenure-track professors and laboratory scientists holding equivalent appointments who are within ten years of receiving their PhD.
  - FY 2022 cycle closed. Awards announced June 7, 2022.
  - FY 2023 cycle begins TBD. According to past practice, FOA should be open to candidates obtaining Ph.D. in year 2012 or later. In recent years, eligibility extensions have been considered for "major life events".
- Common Office of Science criteria:
  - Mandatory five-year program.
  - ≥$750K for university PIs, ≥$2,500K for lab PIs.
  - Funding can be front (or back) loaded
- Program designed to be highly competitive with high impact.
  - Identify and support the future HEP research leaders
  - Over 13 years, 146 HEP awards made from ~1200 submitted proposals: 12.0% success rate.

HEP Review Procedure

- Three-step merit review process:
  - Stage 1: Three to six mail-in reviews collected for each candidate in each research subprogram*.
    - *Advanced Accelerator R&D, Cosmic Frontier, Detector R&D, Energy Frontier, Intensity Frontier, Theoretical and Computational HEP.
  - Stage 2: Finalists selected based on mail-in reviews, programmatic priorities, and panel discussions.
  - Stage 3: Panel review of ~24 proposals selected by subprogram panels, with a super-panel evaluating all proposals together.
- "Super Panel" approach:
  - Lab and university proposals are reviewed together.
  - All six subprogram Accelerator R&D, Cosmic, Detector R&D, Energy, Intensity and Theory are reviewed together.
    - We do not expect panelists to be experts in all proposal topics, but they should take a "big picture" view of which proposals/PIs are most likely to impact HEP.

Early Career Research vs. Core Research

- There are many overlaps between proposals to the HEP Early Career program and the HEP core research program.
  - All proposals are subject to similar scientific/technical merit and program policy factors, and a comparative review is used to select the strongest proposals.
  - ***Alignment*** with programmatic priorities is extremely important
  - The Strongest proposals offer a compelling research program over the entire course of the project period
    - ☑ Interesting? Novel? Significant? Plausibly achievable?
    - ☒ Incremental? Implausibly ambitious? Poorly presented?
    - ***A Balanced program*** of R&D/design, support of construction or operations, data analysis, …
- There are important differences, however:
  - The Early Career proposal success rate is much lower (~ 12%) than for regular research proposals
    - The Strong competition favors extremely clear, well-written proposals that leave no question about the PI's scientific vision and capability.
    - Reviewers tend to reward scientific **Vision**, **Innovation**, and **Leadership** over steady, reliable progress.

ECRP Merit Review Criteria

- Six criteria for all proposals across Office of Science:
  1. Scientific and/or Technical Merit of the Project
  2. Appropriateness of the Proposed Method or Approach
  3. Competency of Research Team and Adequacy of Available Resources
  4. Reasonableness and Appropriateness of the Proposed Budget
  5. Relevance to the mission of the DOE Office of High Energy Physics (HEP) program
  6. Potential for leadership in the scientific community
- All are important; the blue ones typically provide more differentiation between proposals.
- "Mission relevance" is important; HEP does not like to use the Early Career award to launch a new Project.
- There are many styles of "Leadership". Stress those that describe you!

Develop a Personal Roadmap

- Timescales for HEP projects from conception to first data will only get longer in the continued pursuit of discovery science **due to cost, size and complexity**
- HEP academic research track (Univ. or Lab) will benefit from developing a near-, mid- and long-term research plan
  - Balance research between ongoing experiment, upgrades and R&D with future experiment
- A new university tenured-track faculty or lab scientist is likely to **"hit the ground running"** by continuing the research conducted during the most recent post-doc position
  - This is perfectly normal. Most people are hired with this consideration.
  - A rising trajectory, clear leadership positions, track record of accomplishments, mentoring, etc.

- **Before preparing that first proposal, map out your long-term strategic goals (10+ years)**
- Will you be working on that same experiment in 5 years? How about 10 years? In 20 years?!
- Optimize your start-up or LDRD funds by expanding your research portfolio and seeding a future-looking project/experiment
- With your strong participation, major projects like Mu2e, LBNF/DUNE, Vera Rubin Observatory, and HL-LHC CMS and ATLAS will complete on time and be poised to reap the physics data on Day 1
- **Can you envision yourself (and your colleagues) shepherding the next set of P5 projects?**

Early Career Proposal Framework

1. What are the problems you are trying to solve?
2. Is someone else doing it? Is that already being funded?
3. How does this research exploit/engage the unique capabilities of your institution?
4. What are the resources you need to do this project?
5. Outline a five year timeline, with key deliverables and personnel.
6. Why you are a future leader in high energy physics?

Final Word: Engagement

- Review criteria for HEP Comparative Review and Early Career includes "Potential for leadership within the scientific community."
  - Important to seek out and/or volunteer for roles and responsibilities which increase visibility and provide career advancement opportunities
  - Editorial Boards, Sub-detector systems, Physics Working Groups, Run Coordinator, Analysis Coordinator, etc.
  - Service work for community is also valued, e.g. co-chairing a conference committee or serving on a DOE or NSF review panel
- When asked to review, co-chair, attend, speak, etc. **try NOT to say no!**
  - You need the experience
  - Ask for feedback (if possible)
  - Respond promptly to all communication

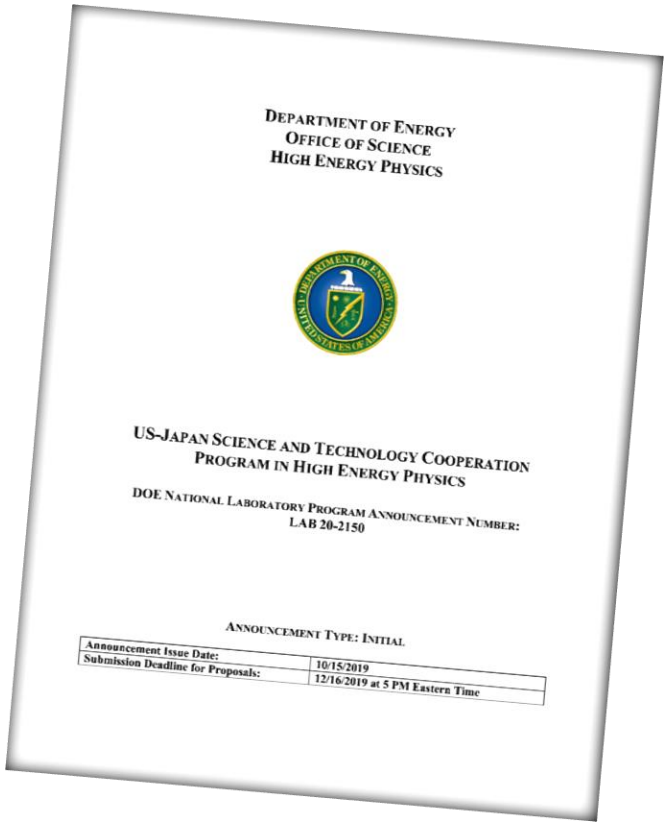
- Talk to your community representatives
- HEPAP: High Energy Physics Advisory Panel
  - http://science.osti.gov/hep/hepap/
- AAAC: Astronomy and Astrophysics Advisory Committee
  - https://www.nsf.gov/mps/ast/aaac.jsp
- APS Division of Particles and Fields
  - https://www.aps.org/units/dpf/
- HEP Organization
  - Introduce yourself to the DOE Program Managers
- Ask questions

U.S. DEPARTMENT OF
ENERGY

Office of
Science

U.S.-Japan Science and Technology Cooperation Program In High Energy Physics

- National Lab Program Announcement (NLA), "US-Japan Science and Technology Cooperation Program in High Energy Physics" is planned for 2023.
  - Will mark the th round of joint US-Japan call for proposals
  - Must be lab-led proposals, consortium model (single lead institution + subcontracts)
- Research areas supported:
  - R&D to enhance the physics yield of current or future HEP experiments
  - Accelerator Science and Technology R&D
  - Detector R&D for HEP
  - Workshops, conferences and/or travel to incubate and develop new concepts
  - Proposals must involve significant collaboration between US and Japanese investigators
- NOT supported:
  - ILC cost-reduction R&D (separate funding mechanism for this).
  - Proposals that do not involve significant collaboration between U.S. and Japanese investigators will not be supported.
  - Theoretical research, except via workshops as noted above.
  - Scientific staff. Support for engineering or technical staff ok.



DEPARTMENT OF ENERGY
OFFICE OF SCIENCE
HIGH ENERGY PHYSICS

US-JAPAN SCIENCE AND TECHNOLOGY COOPERATION PROGRAM IN HIGH ENERGY PHYSICS

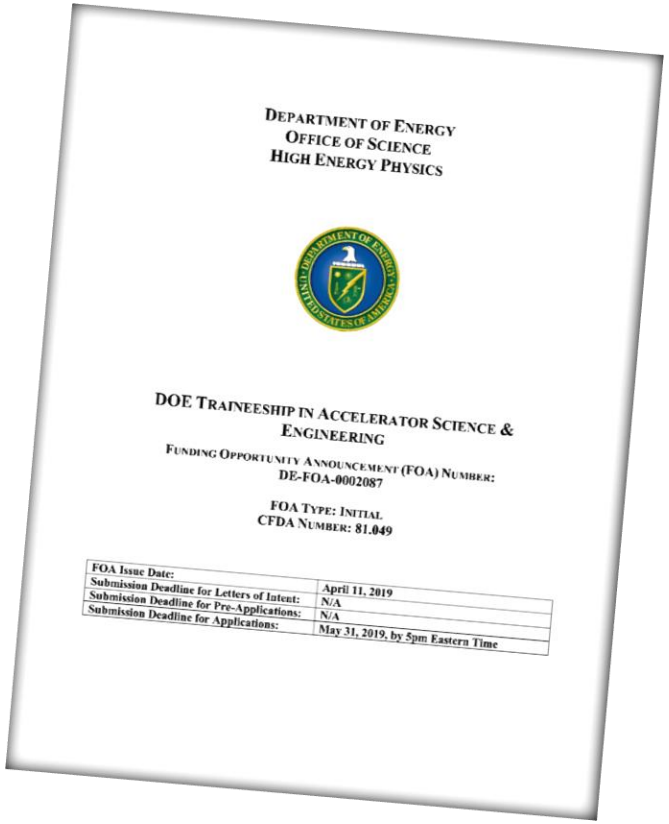
DOE NATIONAL LABORATORY PROGRAM ANNOUNCEMENT NUMBER: LAB 20-2150

ANNOUNCEMENT TYPE: INITIAL

Announcement Issue Date:	10/15/2019
Submission Deadline for Proposals:	12/16/2019 at 5 PM Eastern Time

DOE Traineeships In Accelerator Science & Technology

- The goal of the DOE Traineeships in Accelerator Science & Technology is to train the next generation of accelerator physicists and engineers to meet an expected demand for qualified personnel in this critical area.
- Traineeships support graduate student stipends and core curriculum development at universities that have partnered with other universities and DOE national labs.
- Eligible Institutions: Domestic universities, colleges. DOE Labs are not eligible to apply but partnering with DOE labs is strongly encouraged.
- Preproposals and Letters of Intent are not required.



DEPARTMENT OF ENERGY
OFFICE OF SCIENCE
HIGH ENERGY PHYSICS

DOE TRAINEESHIP IN ACCELERATOR SCIENCE & ENGINEERING

FUNDING OPPORTUNITY ANNOUNCEMENT (FOA) NUMBER:
DE-FOA-0002087

FOA TYPE: INITIAL
CFDA NUMBER: 81.049

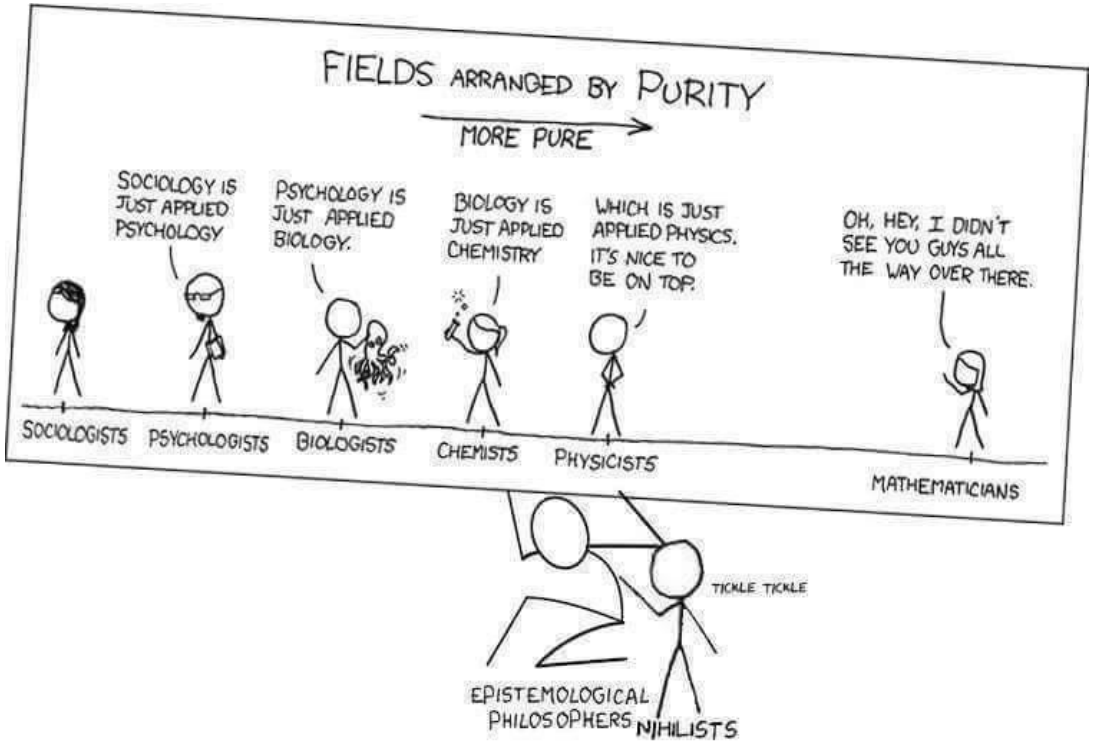
FOA Issue Date:	April 11, 2019
Submission Deadline for Letters of Intent:	N/A
Submission Deadline for Pre-Applications:	N/A
Submission Deadline for Applications:	May 31, 2019, by 5pm Eastern Time

U.S. DEPARTMENT OF ENERGY | Office of Science

Extra Slides on preparing proposals for the Early Career Research Program

Explain why YOU are the one to solve the Problem

- Provide compelling argument backed up with evidence: simulations, LDRD, startup, letters of support, track record
- Explain how the proposed research:
  - Exceeds currently supported effort
  - Is not supported by baseline project
  - Is not duplicative (Federal funding)



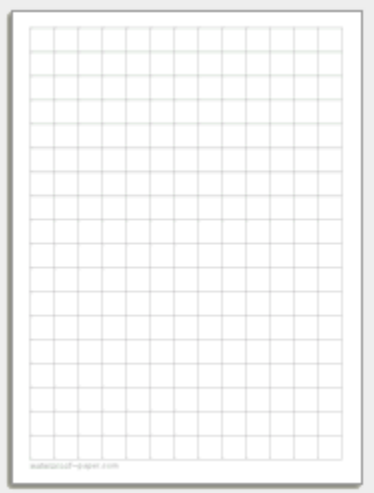
What Is Your "Unfair Competitive Advantage?"

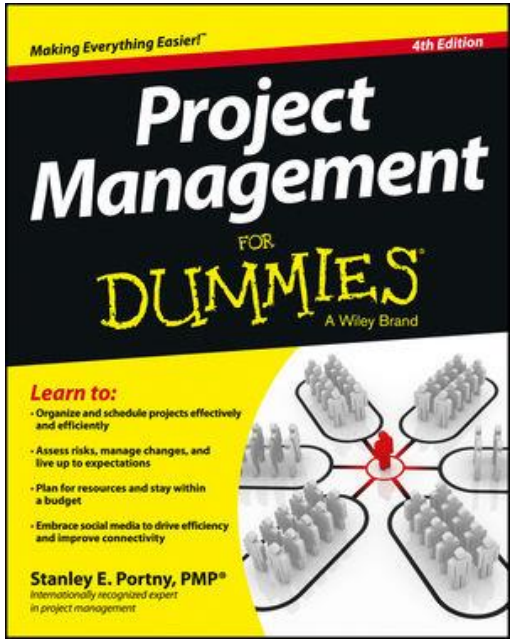
- This has greater weight for the proposals submitted from the DOE National Laboratories
  - In particular, we are interested in how the proposals leverage a lab's unique facilities and capabilities.
  - If this is not called out, a lab proposal has a lower chance in getting funded.

- For experimental and technology proposals submitted from Universities
  - We are also interested in how the proposals leverage the Universities facilities and resources
  - Reminder: Grants are financial assistance agreements and do not cover all costs

Validate: Costs, Resources, Schedule

- Outline a five year timeline, with yearly key deliverables, all personnel, roles and responsibilities
  - Consider month by month plan
  - What is a credible hiring plan?
  - Do you need to front-load funding to support engineering and equipment?
    - For example: 200/200/150/100/100
  - Can you delay the hire of a post-doc?
  - Do you have external dependences, and if so, does your schedule and deliverables make sense?
    - For example: Will the widget arrive too late for the project baseline decision?
  - Have you validated all expenses?





Demonstrate Leadership

- Presidential Early Career Awards for Scientists and Engineers (PECASE)
  - PECASE-eligible candidates are selected from the pool of Early Career awardees

    http://science.energy.gov/about/honors-and-awards/pecase/

- Scientific leadership can be defined very broadly and can include direct research contributions
  - How has the PI demonstrated the potential for scientific leadership and creative vision?
  - How has the PI been recognized as a leader (collaboration, institution, community service)?
  - Does the PI have a track record for mentoring students and post-docs?
- Ensure the CV is correct and current
- Polish up your public-facing online presence
  - Do you have a professional, PR-friendly photo posted on your institution's web site?

Proposals: What To Do

Do Follow Instructions

- Read the current FOA thoroughly, as well as any supporting materials, e.g. FAQ
- SC rules & procedures and HEP program requirements are regularly updated

Do seek out advice & support from trusted colleagues & mentors

- Your institution has invested a lot of time and money hiring you. They want you to succeed. Let them help you
- Request a review of the proposal.
  There are resources at most institutions

Do learn the rules, regulations, and costs of your institution

- Funds are awarded to the institution. Understand direct and indirect rates, benefits, and restrictions
- Establish a relationship with your budget office or sponsored research office

Do follow through on reviewer feedback

- Give weight to the critical reviews
- Arguing with HEP that 3 out of 5 reviewers thought your proposal was excellent does not address the 2 reviewers who had a different opinion

Do follow proper English grammar and composition

- Careless editing will annoy or confuse reviewers
- Hire someone to proof-read your proposal

Do ask for what you reasonably need

- Standard research requests
  - Salary and travel
  - Other Personnel including post-docs, students, Engineer, etc.
  - Equipment, M&S, Tuition remission
- Realistic funding expectations
  - Early Career >$150k Univ & >$500k Lab
  - 50% FTE to proposal
  - Stagger personnel

Proposals: What **Not** To Do

Do Not submit a proposal late

- You should assume that applications received after the deadline will not be reviewed or considered for award
- Use the weeks or months after the FOA is made public to prepare and then submit your proposal early

Do Not brag or exaggerate

- Be professional and objective.
- Fully list your accomplishments in the bio. Include your mentoring.
- Accurately and reasonably describe research plan

Do Not bury the message

- The narrative should be accessible to a review panel with a wide range of expertise
- Avoid jargon when possible. Same with acronyms.
- Describe in clear and concise language. Tell a story.

Do Not dwell on the past

- General rule of thumb (1/3:2/3).
- No more than one-third of proposal devoted to past efforts
- Majority of proposal narrative should be forward looking

Do Not submit a sloppy budget

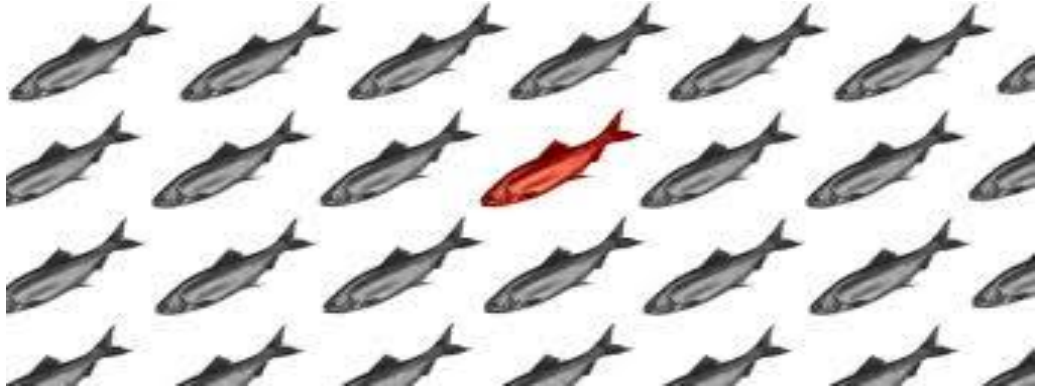
- The budget sheets and justification should be prepared with the same care as the narrative
- Reviewers will call out any:
  - Excessive or inappropriate requests
  - Arithmetic errors
  - Poorly justified expenses

Do Not be discouraged

- Competition is strong.
- Some very good proposals are declined due to limited resources.
- That first feedback is so valuable.

Beware of Red Herrings

- A red herring is something that misleads or distracts from a relevant or important issue.



- Examples include:
  - Vague narrative descriptions, poorly described tables and figures, or dubious budget requests will lead reviewers/panel to make their own interpretations
  - Other (funded) research that is not crisply delineated from the proposed research
  - Unclear explanations of supported personnel, required resources, and timeline for deliverables
  - Poor grammar

Avoid Confusing the Reviewer

- Avoid starting sentences – and especially paragraphs – with "**It is…**"
  - You can confuse the reader. What exactly does "it" refer to?
- Constrain the usage of conjunctive adverbs (see table below)
  - Use Search and count. We've seen proposals with >20 uses "finally". Trimming these "filler" words down will free up space for constructive narrative.
- Be precise – eliminate the usage of significantly, substantially, very, really, etc.

A conjunctive adverb connects two independent clauses.

Cause or effect	Sequence	Time	Contrast
Therefore	Next	Before	However
Hence	Furthermore	Meanwhile	Instead
Accordingly	In addition	Now	Rather
Then	Finally	Since	In spite of
Thus	Moreover	Lately	

Emphasis	Summarize	Illustrate	Comparison
Indeed	Finally	For example	Also
Of course	In conclusion	Namely	Likewise
Certainly	In summary	For instance	Similarly

- Expressing what you **WILL** do is much more important than what you can or may do
  - Search/replace usages: can, could, may, might
- Jargon, Acronyms, and Initializations
  - Always define. Not every reader is an expert in your sub-field
  - If only used once or twice, can you drop it entirely?
  - Keep in mind that each instance of an unfamiliar word, phrase, or term will interrupt the reader's comprehension

Tell a Story

- The best compliment that you can get from a reviewer
  "This was a pleasure to read."
  - Avoid the trap of "narrow casting." Readers of your proposal will come from many disciplines within particle physics, accelerator science, and related fields
  - Provide enough detail to satisfy the experts without losing the broader audience.
- Intersperse graphics to stimulate and illustrate
  - A single compelling image is often more impactful than paragraphs of narrative
  - Avoid using: a copy of a copy; a collage of tiny plots; a graphic that is outdated

- Begin with "Why?"
  - **Why** tends to **reach an emotional chord with audiences** that can inspire the actions you desire. When communicating about vision, values, broad concepts, start with the why
  - **What** – once inspired, **adults have a strong desire to know** more about the what
  - **Who** refers to the breakdown of your research team as you pose your questions. Be mindful to think cross functionally
  - **Where** needs a thoughtful, detailed analysis for your efforts to be most successful
  - **When** will give you a sense of direction and sometimes urgency
  - **How** is usually the "work horse" of your planning team and guides your project planning with tasks and tactics

Start with the Answer

- **Grab the attention of the reader**, by providing the **Why** within a few sentences in the very first paragraph using Plain English
  - Do not bury the lede with paragraphs on the history of the relevant physics or the experiment
  - The context to the thesis of your project should be deferred to the narrative section, and in some cases, the appendix.
  - Ask non-physicists to read your narrative, and see if they can paraphrase your opening paragraph. **Does it pass the "parent test"?**
- Drawing an analogy to films, TV, and novels. Starting with the answer builds **Suspense**
  - **Readers feel suspense when they are deeply curious** about what will happen next, or when they know what is likely to happen **but don't know how it will happen**. Even in historical fiction, with characters whose life stories are well known, the **why** usually brings suspense to the novel.
  - Every film needs suspense. At the foundational level, a story poses a question in the beginning and answers it by the end. The suspense is the anticipation for that answer. A filmmaker who puts the **ending at the beginning** is hoping to entertain us with **HOW events unfold**

U.S. DEPARTMENT OF
ENERGY

Office of
Science

Summary of DOE/HEP Solicitations

- FY 2022 RENEW-HEP [DE-FOA-0002759], "Reaching a New Energy Sciences Workforce for High Energy Physics"
- "FY 2023 Research Opportunities in High Energy Physics" [DE-FOA-000xxxx]
- "Early Career Research Program" [DE-FOA-000xxxx]
- "DOE Traineeship In Accelerator Science & Technology" [DE-FOA-000xxxx]
- "U.S.-Japan Science and Technology Cooperation Program In High Energy Physics" [LAB 23-xxxx] (Lab call only)
- "FY 2023 Continuation of Solicitation for the Office of Science Financial Assistance Program" [DE-FOA-000xxxx]
- Other possible FOAs (funds permitting) in FY 2023 include:
  - RENEW-HEP and FAIR (Possibly Separate or Combined)
  - Computational HEP and/or AI/ML R&D
  - Microelectronics